

MINISTRY OF LABOUR

Report of the
Joint Advisory Committee
for the
Cutlery and Silverware Trades
in Sheffield and District



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CONTENTS

	<i>Page</i>
Membership of the Joint Advisory Committee for the Cutlery and Silverware Trades in Sheffield and District	iv
Introductory Letter to the Minister	1
Welfare and Hygiene	<i>Paras.</i>
Drinking Water	1-2 4
Washing Facilities	3-4 4
Clothing Accommodation	5-6 5
Facilities for Sitting	7-8 5
First Aid	9-10 6
Medical Services	11 6
Sanitary Accommodation	12-14 6
Protective Clothing	15-17 8
Fume in Non-Ferrous Casting Processes	18-19 9
Messrooms and Canteen Facilities	20-21 9
Welfare Supervision	22-23 10
Cleanliness and Dust	
Cleanliness	24-29 11
Dust	30-34 15
Machinery	35 17
Polishing Wheels	36-37 17
Power Presses	38-39 22
Automatic Roll Polishing Machines	40-41 23
Other Machinery	42-43 25
Appendices	
I References concerning Dust Extraction and Control	37
II Processes using Power Presses	38
III Analysis of all accidents 1956 to 1963	55

Report of the Joint Advisory Committee for the Cutlery and Silverware Trades in Sheffield and District

To: The Rt. Hon. J. B. Godber,
Minister of Labour.

Sir,

We were appointed by you as a Joint Advisory Committee to advise you on matters affecting the health, safety and welfare of persons employed in the manufacture of cutlery, spoons, forks or hollow-ware in Sheffield and the surrounding district, and to report.

We met on six occasions during the period 16th June, 1960 to 1963. At the first meeting it was decided that the three aspects of our enquiry, health, safety and welfare, would be investigated in detail by Sub-Committees. These Sub-Committees were therefore formed to consider the following matters:

Welfare and hygiene.

Cleanliness and dust.

Machinery.

Each Sub-Committee held several meetings, paid visits to factories, and sought expert advice where appropriate. The reports of these Sub-Committees were reviewed, amended and accepted by the Main Committee and together form the basis of this report to you.

The sections on cleanliness and dust arise from an examination of all aspects of cleanliness in cutlery and silverware factories, and consideration of methods of dust suppression and collection in abrasive processes. The two subjects are inter-related but have been treated separately because many of the steps recommended for improving cleanliness could, and should, be put into effect immediately, whilst improved methods of dust suppression may require a longer term approach.

Welfare and hygiene matters have been examined under a series of headings using existing legal requirements as a framework. Reference has been made on a number of occasions to conditions in casting shops and several recommendations refer specifically to casting processes. It was known that a Code of Regulations dealing with non-ferrous foundries was being prepared and we felt that the Regulations should be extended to cover casting shops. Since then a revised Code (The Non-Ferrous (Melting and Founding) Regulations 1962) brought casting shops within its terms. The application of these Regulations to our recommendations has been indicated where appropriate.

Our investigations of machinery hazards arose from a study of the accidents arising in the trades. Statistics of reported accidents from 1956 to 1962 were examined and they indicated the classes of machinery meriting special attention. Recommendations have also been made on other machines which, although not producing a substantial number of accidents in the years investigated, were thought to be dangerous.

The Report contains a short summary of the matters discussed under each topic, followed, in some cases by a statement of existing legal requirements, and concluding with a list of recommendations.

Except for one instance (in paragraph 36, which deals with polishing wheels) we have not deemed it necessary to define the terms we have used to describe various processes and items of plant as we believe them to be universally understood in the trades.

It will be noted that reference is made on several occasions to the large number of small firms which make up the cutlery and silverware trades. The system of manufacture by small concerns, each performing its own specialised part of the process, still exists strongly today, although there is a marked tendency towards integration into larger units carrying out the complete process from raw material to finished product.

The following table shows the size distribution of factories at the time of this Committee's inception in 1960.

Size	No. of factories	No. of employees
1-5	186	478
6-10	76	567
11-24	67	1,133
25-99	59	2,799
100-249	16	2,185
250 and over	11	4,540
	415	11,702

It was estimated that of the total employees 54% were women, 35% men, 7% girls, and 4% boys.

You will be aware that the cutlery industry has been the subject of two previous investigations. The first was conducted by the Cutlery Wages Council (Great Britain) and a Report was published by direction of the Minister of Labour and National Service in 1946. The second was conducted by a Working Party of the Board of Trade and a Report to the President of the Board of Trade was published in 1947. Both Reports made severe criticisms of working conditions in many cutlery factories and we bore these criticisms in mind when considering our terms of reference.

Representatives from the Cutlery Manufacturers Association suggested to the Superintending Inspector of Factories in Sheffield that periodic meetings should be held to discuss problems affecting the industry. Your predecessor, The Rt. Hon. Edward Heath, decided to appoint the present Committee to examine these problems. In presenting this Report to you we feel strongly that, first, our recommendations should be published for the benefit of the industry and, second, to ensure that the recommendations are not forgotten, a committee should be appointed in accordance with the original proposals to review and report on the progress made.

The Committee wish to acknowledge assistance received from Mr. R. K. Mawson, H.M. Deputy Senior Engineering Inspector of Factories, Mr. W. B. Lawrie, H.M. Engineering Inspector of Factories, Dr. A. H. Baynes, H.M. Medical Inspector of Factories, Mrs. C. M. Veale, formerly Welfare Officer for Messrs. Viners, Ltd., and Miss F. Hornbrook, Industrial Relations Officer, Ministry of Labour.

The co-operation of a number of individual firms in permitting members to visit their factories and publish details of safety devices, etc. has greatly facilitated our work.

We wish to record our appreciation of the guidance given by our Chairman, Mr. Hillier, and of the very efficient work done by our Secretary, Mr. Lupson, in making all the necessary arrangements and in preparing our Reports.

In accordance with the terms of our appointment we have the honour to make the following Report.

We have the honour to be, Sir,
Your obedient Servants,

(Signed) R. HILLIER (*Chairman*)
H. BRIGHT
A. CHADWICK
H. ELLIS
J. W. HODGKINSON
T. N. KENNEDY
A. LEE
E. LILLBYMAN
F. B. LYNCH
F. NEWTON
E. A. OLDFIELD
H. THORPE
R. VINER
B. LUPSON (*Secretary*)

30th April, 1964.

Welfare and Hygiene

Drinking Water

1. On hygienic grounds it was thought that drinking vessels were unsuitable, and, to be in keeping with best modern practice, the provision of drinking water should be by means of upward jets. Various types of "fountain" which can be readily fitted to existing taps or pipes were noted to be available.

The Committee considered the desirability of providing saline drinks in hot processes. They were satisfied that there were hot processes in the cutlery and silverware trades which caused excessive perspiration. Employers should consider the possibility of reducing hot conditions, e.g. by shielding against radiant heat. Induction heating is also being increasingly used. Saline drinks as a means of replacing salt lost from the body through perspiration can well be supplied.

2. Recommendations on Drinking Water

(a) The drinking water supply should be from a public main and should be made available by means of upward jets or "fountains".

(b) In hot processes giving rise to excessive perspiration, consideration should be given to means of reducing radiant heat. Where persons are subjected to heat, saline drinks as a means of replacing salt lost from the body through perspiration should be provided.

Washing Facilities

3. The Committee aimed at determining a numerical standard for the provision of washing facilities, to amplify the general requirements of the law. Other features, such as the provision of shower bath accommodation, which are not statutory matters, were also considered. The Committee noted that shower baths were provided for hot or dirty processes in more progressive firms, in this and other industries, and it was considered that more attention should be given to this aspect in the cutlery and silverware trades. Particularly, it was considered that the provision of shower bath accommodation for those employed in casting shops should be made a statutory requirement, and the Committee, therefore, welcomed the issue of the Non-Ferrous Metals (Melting and Founding) Regulations 1962, by which this will be accomplished.

In connection with standards of design and construction of washing facilities, and clothing accommodation, the Committee commend to the attention of the trades a booklet published by the Ministry of Labour entitled "Cloakroom Accommodation and Washing Facilities in Factories" (Safety, Health and Welfare New Series Booklet No. 5).*

4. Recommendations on Washing Facilities

(a) STANDARDS

For general work, as distinct from hot or dirty processes, a standard of one wash basin or two feet of trough should be provided for every twelve to fifteen persons requiring to wash at any one time.

For hot or dirty processes a standard of one basin or two feet of trough should be provided for every five persons requiring to wash at any one time, unless there are adequate shower bath facilities available. In the latter case the standard should be as for general work, i.e. one washing unit for every twelve to fifteen persons.

*Obtainable from H.M. Stationery Office, price 2s. 6d. net.

Shower baths are provided for hot or dirty processes in more progressive firms, and it is considered that more attention should be given to this aspect in the cutlery and silverware trades.

The Committee note that regulation 15 of the Non-Ferrous Metals (Melting and Founding) Regulations 1962, will require the provision of washing facilities and shower bath accommodation for persons employed in casting shops by 30th July, 1964.

The Committee feel strongly that the use of communal towels as a means of drying at washing facilities is unsuitable, and must be deprecated.

(b) SITTING

In new buildings, washing facilities should be separate from workrooms, and the facilities for men and women should be segregated.

In existing buildings the same arrangement is recommended, although it is recognised that structural considerations might make achievement difficult.

In smaller firms the washing facilities may have to be sited in work-rooms, but efforts should be made to achieve partial separation by screening or similar means.

Clothing Accommodation

5. The Committee examined the advantages and disadvantages of pegs, racks, lockers and cloakrooms. It was decided that, in view of the size range of factory involved, a universally acceptable type of accommodation could not be specified. The features which clothing accommodation should afford could be specified, and a recommendation in that form would be applicable whatever the size of factory or process carried on. They particularly wished to stress the inadequacy of the existing arrangements for drying wet clothing. The booklet published by the Ministry of Labour entitled "Cloakroom Accommodation and Washing Facilities in Factories" is commended for the guidance of employers.

6. Recommendations on Clothing Accommodation

Clothing accommodation affording the following features should be provided:

- (a) Sufficient protection for the clothing against dirt.
- (b) Adequate arrangements for drying wet clothing.
- (c) Adequate arrangements for achieving reasonable security for clothing and personal belongings.

Facilities for Sitting

7. The question of facilities for sitting was considered under the two categories into which it is divided in the Factories Act. These were first, the job which could properly be done sitting down, and second, the job which was normally done standing but which permitted occasional opportunities for sitting down. The second category was thought to be a lesser problem as the seating required was of a simple type, and no recommendation was made.

The Committee could not attempt to embody in any recommendation a schedule of processes with appropriate types of seat. Such a course might prove too restrictive, and might be made absurd by the unpredictable individual preference of workers in the trades. Members were, however, convinced that the industry could usefully pay more attention to the subject than has apparently been the case hitherto.

8. Recommendations on Seating

The aim should be to arrange alternative working positions. At the moment in the industry there are too many jobs which are done wholly sitting or wholly standing. The industry should,

therefore, direct its attention to the various processes, and wherever possible make arrangements to permit alternative working positions.

Caution is urged in selecting the type of seat to be adopted as mistakes can easily be made, and attention is drawn to the useful information contained in the booklet first published by the Ministry of Labour and National Service in 1951, entitled "Seats for Workers in Factories".

First Aid

9. The Committee examined the legal requirements concerning first aid, and considered whether there were any reasons why the cutlery and silverware trades should require a different standard. After obtaining medical advice it was agreed that there were no such reasons. The statutory schedules of equipment were intended to cater for most types of factory accidents. It was agreed that they were minimum standards, and it was open to any firm to add extra equipment to deal with any risks particular to it. The main point was to ensure that at least the statutory minimum of equipment was maintained.

The provision of ambulance rooms was considered and it was generally felt that the value of such rooms was diminished if a full-time attendant was not available. The desirability of having a first-aid attendant available at all times was thought important, and the Committee suggested that the legal position concerning the training of persons in charge of first-aid boxes or cupboards should be stressed. If a trained person with enthusiasm was placed in charge of first aid it might be of advantage to make a room available and equip it for first-aid purposes. It was thought desirable, however, that where women, and particularly young girls, were employed, a rest room or similar facilities should be provided if the numbers justified it.

10. Recommendations on First Aid

There is no reason for recommending the inclusion in first-aid boxes of equipment additional to that required by law. Greater attention must, however, be paid to the maintenance of equipment in the first-aid boxes to the legal standard and that a person qualified in first-aid treatment is required in certain cases. The Committee places great importance upon ensuring that the prescribed standard of training for first-aid persons is achieved.

Where a qualified person is in charge of first-aid arrangements, then, unless an ambulance room with a full-time attendant is provided, a room should be made available and equipped for first-aid purposes.

A rest room or similar facilities should be provided for the use of female employees.

Medical Services

11. The Committee again obtained medical advice on this subject. It was noted that legal requirements as to medical services were very limited, probably because the needs of industry varied so widely.

In the cutlery and silverware trades there was no outstanding medical problem which could make medical services necessary, but the main factor to be taken into account was the size of the factory unit. Whilst recognising the desirability of extending medical services wherever possible in industry, the Committee considered there would be little point in making a recommendation for the cutlery and silverware trades.

Sanitary Accommodation

12. The Committee directed its attention particularly to the subject of cleanliness of sanitary conveniences, especially in premises where the accommodation is used communally by several

firms. The difficulties of persuading personnel to undertake cleaning and to adopt clean habits were appreciated, but it was thought that the higher the standard of accommodation provided, the less frequently would such difficulties arise. The Committee considered that a first step should be to secure, wherever possible, conveniences private to individual firms. Failing this, the conveniences should be locked to prevent unauthorised use. For purposes of supervision and maintenance it was preferable for the sanitary convenience to be within the body of the factory rather than outside in a yard.

The method of decoration and the furnishing of sanitary conveniences was considered in detail and recommendations made accordingly. Whilst recognising the geographical and structural obstacles obtaining in many premises, the Committee felt bound to recommend the provision of a wash-basin in each block of sanitary accommodation.

Members were surprised to learn that the provision of toilet rolls was not already a legal requirement and a recommendation has therefore been made on the subject.

13. Legal Provisions

Factories Act 1961—section 7

(1) Sufficient and suitable sanitary conveniences for the persons employed in the factory shall be provided, maintained and kept clean, and effective provision shall be made for lighting them and, where persons of both sexes are or are intended to be employed (except in the case of factories where the only persons employed are members of the same family dwelling there) the conveniences shall afford proper separate accommodation for persons of each sex.

(2) The Sanitary Accommodation Regulations 1938, prescribe standards for sanitary accommodation.

14. Recommendations on Sanitary Accommodation

(a) Where possible, and certainly in new factories, the sanitary convenience should be in the body of the factory, and where practicable a wash-basin should be available in the sanitary convenience.

(b) Since the worst conditions exist in communal conveniences, arrangements private to individual firms are recommended.

(c) Where there is no alternative to communal sanitary conveniences, proper arrangements should be made for ensuring cleanliness, and the conveniences should be locked to prevent unauthorised use. The keys must be readily available.

(d) The walls of sanitary conveniences should be tiled or be painted in such a way that the surface can be readily washed.

(e) Cleanliness of sanitary conveniences should be made the task of some person employed for the purpose. In smaller firms this could be part of one individual's duty. In larger firms the duty could be linked with supervision of washing and clothing accommodation.

(f) Toilet rolls should be provided.

(g) Seats should always be provided for the pans in sanitary conveniences, and the seats should preferably be made from plastic.

(h) Sanitary towel incinerators should be provided in all but the smallest factories where women are employed, but in all cases adequate provision should be made for disposal.

(j) Employers' attention should be drawn to the desirability of providing vending machines for sanitary towels.

Protective Clothing

15. The subject of protective clothing was considered primarily as a matter of health or welfare, but in certain instances it was recognised that a safety aspect was involved and could not be ignored. With this in mind the Committee reviewed the accident statistics for the past five years and examined those accidents which had resulted in (a) foot injuries, (b) eye injuries, and (c) burns or scalds. The results of this approach are reflected in the Committee's recommendation.

A recommendation concerning the wearing of safety footwear is included. In view of the large proportion of female employees in the trades, the Committee would stress that this recommendation applies to both men and women. Excellent safety footwear in a wide variety of style is available for women.

It will be noted that legal provisions as to protective clothing, insofar as they apply to the cutlery and silverware trades, are very limited, being confined to chromium plating processes, and the Committee had to consider what other work gave rise to conditions where protective clothing might suitably be recommended.

The Committee noted that regulation 13 of the Non-Ferrous Metals (Melting and Founding) Regulations 1962, has now covered their recommendations as to the provision of gloves and eye protection for persons employed in casting processes. They considered, in addition, both foot and leg protection was desirable.

16. Legal Provisions

The Chromium Plating Regulations 1931

Regulation 3—the occupier shall provide and maintain in good condition (a) for the use of all persons employed, aprons with bibs; (b) for the use of those working at a bath, loose-fitting rubber gloves of suitable length, and rubber boots or other waterproof footwear.

The aprons and bibs shall be of sufficient length and suitable material, which in the case of persons working at a bath shall be rubber, leather or some other impermeable material.

The Non-Ferrous Metals (Melting and Founding) Regulations 1962

Regulation 13(1)—There shall be provided and maintained suitable protective equipment of the types and for the operations or work respectively hereafter in this regulation specified for the protection of persons employed in any such operations or work, that is to say—

(a) suitable gloves or other suitable protection for the hands for persons employed in handling any hot material likely to cause damage to the hands by burn, scald or sear, or in handling rough or irregular material likely to cause damage to the hands by cut or abrasion;

(b) without prejudice to the requirements of regulation 11(1), respirators of an approved type for persons employed in work in an area where there is a heavy concentration of dust;

(c) suitable goggles or other suitable eye protection for persons employed in:

(i) work at a furnace where there is risk to the eyes from molten metal; or

(ii) pouring or skimming; or

(iii) work involving risk to the eyes from hot sand being thrown off.

17. Recommendations on Protective Clothing

(a) The standards of protective clothing required for workers in processes subject to the Chromium Plating Regulations 1931, should be provided for all persons employed on similar work in plating shops.

(b) Safety footwear should be adopted more widely. The attention of employers should be drawn to the advantages to be gained from organising the sale and distribution of such footwear to their employees.

(c) The following protective clothing is recommended for those employed in non-ferrous casting processes where there is risk of injury from molten metal:

(i) Safety boots or clogs of the foundry type, that is, incorporating a safety toe cap, a stitched tongue, and a clasp fastening capable of being quickly released. In crucible casting shops it is felt that clogs might be more suitable than boots.

(ii) Leg protection—This may take the form of spats or sacking coverings, but it must be ensured that the covering overlaps the footwear.

(iii) Eye protection.

(iv) Gloves or other suitable protection for the hands.

(d) Protection for the eyes should be provided for abrasive processes carried on at hand abrasive wheels and dressed wheels, and for handle-polishing processes. The Committee notes that suitable goggles or effective screens are statutorily required for persons employed in dry grinding of metals or articles of metal applied by hand to a revolving wheel or disc driven by mechanical power.

(e) Attention should be drawn to the fact that the Report of the Committee on Conditions in the Drop Forging Industry* applies to drop forging processes in the cutlery and silverware trades. The recommendations made in the Report, particularly with regard to the protective clothing should be observed.

Fume in Non-Ferrous Casting Processes

18. This subject arose during discussions on protective clothing, when the need for respirators for persons employed in non-ferrous casting processes was considered. It had been observed that there was heavy emission of zinc oxide fume during pouring, and that simple forms of respirator were often used by employees. The problem was thought to be primarily one of exhaust ventilation. The processes are comparable with those carried on in other non-ferrous foundries and the Committee welcomes the provisions of regulations 11 and 12 of the Non-Ferrous Metals (Melting and Founding) Regulations 1962. The Committee recognises that the normal practice is for melting and pouring in non-ferrous casting processes to be carried out in well ventilated shops, and for the operatives to wear respirators as protection against fume.

It is noted, however, that regulation 11(1) will require, from 30th July, 1964, that so far as reasonably practicable workers should be protected from inhalation of fume, otherwise than by wearing of respirators. The Committee believes that fume in casting shops can be dealt with by means of exhaust ventilation, and considers that this should be done.

19. Recommendations on Fume in Casting Processes

In casting shops suitable exhaust ventilation should be provided at the casting position, to collect the fumes given off during casting into the ingot mould. This measure would not only prevent the escape of fume into the atmosphere of the workshop, but would enable recovery of valuable elements to be accomplished, and would facilitate compliance with "Clean Air" Regulations.

Messrooms and Canteen Facilities

20. The Committee noted that there were very few factories in the cutlery and silverware trades where a full canteen, serving cooked meals, was provided. It was recognised that the provision of canteens was a problem encountered throughout industry and there were no features in the

*Obtainable from H.M. Stationery Office, price 1s. 6d. net.

cutlery and silverware trades to warrant special recommendations. Messrooms, where workers could eat their own food, or where means of heating food and boiling water is available, are more widely provided, and it was thought that in modern industry it should not be necessary for workers to take meals in a workroom.

The Committee notes that regulation 16 of the Non-Ferrous Metals (Melting and Founding) Regulations 1962, contains requirements as to facilities for taking meals which would apply to casting shops in the trade.

21. Recommendations on Messrooms

The taking of meals in workrooms is not desirable, and there should be made available, wherever possible, a separate place, apart from the workrooms, for use as a messroom.

Welfare Supervision

22. This subject arose as a corollary of all the previous topics surveyed by the Committee. Members felt very strongly that it would be useless for firms to carry out improvements in welfare facilities, in accordance with the Committee's previous recommendations, unless some specific arrangement was made for their continued maintenance and supervision.

Expert advice was obtained on forms of welfare supervision and methods of training of welfare supervisors. The Committee envisaged the appointment by firms of responsible persons to be given the duty of supervising welfare arrangements on a part-time basis. Such persons would normally require elementary training in the basic aspects of industrial health and welfare, legal requirements, and the recommendations of the J.A.C. Report.

There are no existing organisations undertaking regular training courses of this type and it would be necessary for the cutlery and silverware trades to plan their own scheme. The Committee felt confident that this could be done by co-operation between the Ministry of Labour, the Trade Associations, and advisory bodies such as the Industrial Welfare Society.

The essential first step would be to secure the determined support of firms' managements, for without it the project would fail. It is suggested that a Committee be formed to consider the means by which its proposals could best be put before managements, and to work out details of a training course for welfare supervisors.

The Committee thought the training course should enable supervisors to undertake the following duties:

- Supervision of cleanliness throughout the factory, and control of cleaning staff.

- Supervision of washing facilities, soap and towels, etc.

- Supervision of clothing accommodation.

- Provision of protective clothing

- Supervision of messrooms, where provided.

- The duties might be linked with first aid in appropriate cases.

The support from managements is essential for the success of these proposals. It is felt this could best be obtained if a conference were held at which the Committee's recommendations could be stressed and details of a proposed training scheme explained.

23. Recommendations on Welfare Supervision

- (a) That a Committee be formed to determine a suitable training course for welfare supervisors and to indicate the duties of persons so appointed.

- (b) That a Management Conference be convened to stress the proposals and explain the details.

Cleanliness and Dust

Cleanliness

24. Standards of cleanliness in much of the industry are no different from those in other light industries; in fact, some firms maintain a very high degree of cleanliness. Nevertheless, the cutlery and silverware trades have a reputation for being dirty. The main reasons for this were thought to be

- (1) The industry is old and has remained in the same locality for centuries, therefore it has to fight the tradition of poor working conditions inherited from these earlier times.
- (2) The industry is housed largely in old buildings, which have structural features not conducive to cleanliness. For example, the natural lighting is often of a poor standard.
- (3) The staple industry locally, steel, is a heavy, hot industry providing a black background which workers tend to accept as normal.
Dense, heavy industry produces a heavy dirt deposit over the whole area. This may prove discouraging to routine cleaning, whilst making it even more necessary.
There has not been, until recently, much light industry locally to provide a contrast or set an example of modern factory conditions.
- (4) The trades are carried on by a large number of small firms which do not have sufficient capital to undertake improvement schemes. The insecurity of small units is, in some cases, a further discouragement to spending money on improvements.
- (5) The threat of demolition under Local Authority development plans has often been claimed as an obstacle to carrying out structural repairs and improvements.
- (6) The processes are carried on in many premises by persons who "work on their own account" and do not employ anyone. The premises are not, therefore, within the scope of the Factories Act and the working conditions are often of a poor standard. Small employers in neighbouring premises tend to compare themselves with such independent workers, with whom they are in competition, and regulate their standards accordingly.
- (7) The standards of the small firms tend to be carried over and perpetuated in the larger ones.
- (8) The trades include many abrasive operations producing dust and grease. Employers and workers become inured to the presence of dirt.

25. The Committee considered in detail the statutory requirements relating to cleanliness, contained in section 1 of the Factories Act 1961. The following points were considered to warrant special mention:

- (1) Paragraph (2)(a) of section 1 of the Act, which relates to daily removal of accumulations of dirt and refuse from the floors and benches, was not sufficiently widely known to employers or workers in the trades. It is suggested that this requirement be emphasised and the trades urged to ensure that it is put into effect (Recommendation (c)). The Committee appreciated that difficulty might arise in certain of the handicrafts where the number of hand tools used on benches was large in proportion to the number of articles processed, but in these cases dirt and refuse is not likely to accumulate very quickly. The processes of sand and pumice buffing also present difficulty in that the dirt and refuse is initially a process material. Such exceptions should not invalidate the general recommendation for greater attention to be paid to daily cleaning routines.

The Committee thought too little use was made of such aids to good housekeeping as bins, boxes, racks and shelves for the storage of loose tools, materials, and articles in process (Recommendation (d)).

- (2) Paragraph (2)(b) of section 1, which relates to weekly cleaning of floors, is probably more widely known and observed than the foregoing requirement. Sweeping down on Friday afternoons is a widely practised routine. Nevertheless, opportunity should be taken to bring both matters to the attention of the trades. It should be emphasised that cleaning of the floor must include the whole of the floor area, including parts under benches and out-of-the-way corners. For cutlery and silverware factories generally, sweeping should be a satisfactory method.

An exception occurs in certain greasy abrasive operations, for example, at "double-heading" machines, where heavy grease deposits become compacted on floors. Periodic scraping, which is only partially successful, is the method usually adopted. In some firms sand or sawdust is sprinkled on the floors to aid grease removal.

An experiment carried out on the concrete floor surrounding a machine in the laboratory of the Cutlery Research Council revealed that a proprietary de-greasing agent of the emulsifying type was very effective. The floor had accumulated a thick layer of grease which could not be removed completely by scraping. Various chemical solvents were tried and the best was found to be an emulsifying agent made by D.E.B. Chemical Proprietaries Limited, sold under the trade name "Jizer". After two applications this produced a clean, grease-free surface. Investigation is suggested to examine the effects of this substance on a grease impregnated wooden floor (Recommendation (d)(ii)).

As in the case of daily cleaning routines, adequate cleaning of floors can be assisted by tidiness and good housekeeping. Congestion of plant and loose materials is a deterrent to regular and thorough cleaning. Again, the adoption of racks, shelves, etc., is commended (Recommendation (d)).

In small firms, routine cleaning becomes the responsibility of all employees. It is therefore vital that habits of tidy working should be introduced and encouraged. Only by regular and systematic tidying and cleaning is an improvement in conditions likely to take place (Recommendation (c)).

It has been suggested that in some cases sufficient brushes and cleaning materials are not provided. It is recommended that the attention of employers be drawn to the need for making equipment available for the use of employees who are expected to participate in cleaning routines (Recommendation (d)(ii)).

- (3) The requirement of sub-section (3) of section 1, which relates to periodic re-decoration of walls, etc., was thought to be generally known in the industry. At least it is commonly known that limewashing of workroom walls is required annually or thereabouts. This requirement is met more often than those previously examined, possibly because it is more susceptible to enforcement—a record of re-decorating must be kept.

Some firms have abandoned the traditional limewash and now paint their walls with washable paints. The Committee thought this trend should be encouraged. Much of the limewashing carried out is merely a fulfilment of the letter of the law, and the treatment is applied to walls regardless of their surface condition. Limewash is applied to walls where the plaster has fallen away, or to wooden partitions where successive layers have produced unsightly flaking. In many instances, although walls are periodically treated, the woodwork of doors and windows is neglected entirely and becomes blackened and greasy (Recommendation (d)(iii)).

In factories where painting has been adopted, it is often forgotten that washing down of the painted surface is required by law at fourteen-monthly intervals.

- (4) The Committee also considered regulation 9 of the Grinding of Cutlery and Edge Tools Regulations 1925 and 1950. The regulation requires three-monthly sweeping of the floor, walls, ceiling, etc., of certain grinding, glazing and polishing rooms. It was thought that this requirement was of value in making a further specific occasion on which a cleaning routine had to be carried out. In this respect it was complementary to the daily, weekly and fourteen-monthly treatments, all of which contribute to keeping the factory in a clean state. Further, since a register must be kept of the dates on which sweeping is done, the matter can be more easily checked. This requirement is rarely met. A deficiency of the regulation is that "sand-buffing" processes are exempted (Recommendation (b)).

Otherwise the Committee thought the existing legal requirements were sufficient. If standards of cleanliness in cutlery and silverware factories are to be improved, the legal requirements must be meticulously carried out, and the legal provisions should be rigorously and equitably enforced (Recommendation (a)).

26. Lighting

The legal requirements concerning lighting, as they apply in most cutlery and silverware factories, are framed in general terms.

The Committee considers that the industry should pay more attention to standards of lighting since this feature is often related to standards of cleanliness. Many cutlery and silverware processes require good local lighting and this is usually available. General lighting over the whole area of the workroom is, however, not always as adequate. In older buildings the natural lighting is often poor owing to the number and design of windows. If natural lighting cannot be improved by, for example, replacing the difficult-to-clean "cottage" type windows by single panes of glass, good artificial lighting affording illumination over the whole workroom should be provided. The low cost of electric light is often not realised. There is a tendency to switch off lights unnecessarily in lesser used parts of workrooms or passages. To keep them on would add little to the electricity bill but would brighten the appearance and contribute to safety. Windows should be cleaned regularly inside and out (Recommendation (d)(iv)).

27. Plant and Fixtures

Although the law requires every factory to be kept in a clean state, and specifically mentions benches, floors, ceilings and walls, the standard of cleanliness, and certainly the impression of cleanliness can be materially affected by the attention paid to plant and internal fixtures. The Committee suggests that corrodible metal parts such as machine frames and casings, guards, pipes, ducting, structural steelwork, furnace casings, tanks, etc., should be kept painted. Similarly, wooden fittings such as racks, shelves and cupboards, should be kept painted (Recommendation (d)(iii)).

It is little use to have a clean factory if such equipment is ignored and there is no incentive in attempting to clean rusty steel or grease-blackened wood. The use of colour is relevant in this connection. Light coloured paints could beneficially be adopted for machine frames, etc. It is believed that the whole impression of a workroom could be improved in this manner and an incentive to more cleanly habits afforded.

28. Cost Factor

The Committee thought that it would be instructive to try to estimate the cost of re-furbishing, so as to bring it into a satisfactory state of cleanliness, an average-sized workroom (20' x 15') in a small cutlery factory. It was assumed that the fabric was basically sound and that the main improvements required would be re-decoration (comprising limewashing of walls, and painting of structural woodwork), thorough cleaning and tidying of floors, benches, etc., and improvement of artificial lighting. The cost was estimated to be not greater than £50.

A firm of decorators who carry out extensive work in factories, including many in the cutlery and silverware trades, was approached, and quotations were obtained for various types of decoration in a workroom of the type described above. For a workroom approximately 20' x 15', with normal door and window space, a cost of £16 to £18 would be quoted for the following work:

- (1) Brushing the walls and removing loose or flaking material from existing limewashed surface.
- (2) Treating with two coats of limewash.
- (3) Treating woodwork (window frames, doors, etc.) with two coats of oil paint.

If a washable water paint was to be used in place of limewash, the cost would be increased by £2 to £4.

For the same workroom a cost of about £60 would be quoted for the following work:

- (1) Chipping off accumulated limewash to permit painting.
- (2) Treating wall surface with two coats of oil paint.
- (3) Treating woodwork with two coats of oil paint.

These sums must, of course, be regarded as very approximate, but they might indicate the extent of the cost factor which, it is commonly assumed, lies at the root of most dirty conditions.

29. Recommendations on Cleanliness

(a) The Committee consider that, with one exception, existing legal requirements relating to cleanliness in the cutlery and silverware trades are sufficient, if carried out, to produce clean conditions. They stress that particular attention should be paid to these requirements in all premises irrespective of their age or size.

(b) The exemption of "sand huffing" processes from regulation 9 of the Grinding of Cutlery and Edge Tools Special Regulations 1925 and 1950, is undesirable. In fact, sand and pumice processes are amongst the dirtiest in the cutlery and silverware trades and merit special attention in all aspects of cleanliness.

(c) An effective publicity campaign should be organised to promote habits of cleanliness at both the shop floor and management levels. The campaign should be planned by specialists in public relations so that advantage can be taken of modern methods of persuasion.

(d) The following practical means of improving cleanliness are recommended:—

- (i) Greater use should be made of such aids to "good housekeeping" as bins, boxes, racks and shelves for storage of loose tools, materials, and articles in process.
- (ii) Employers should ensure that sufficient cleaning equipment is available for the use of employees who are expected to participate in cleaning routines. Investigation should be carried out to discover means of preventing the floors becoming contaminated with grease in certain grease polishing processes (particularly double-headed glazing), or if this is not successful, to discover satisfactory cleaning agents for removing grease from the floor; the use of an emulsifying degreasing agent has been found successful for concrete floors.
- (iii) The surface of walls and ceilings should be maintained in a sound state to permit periodic decoration to be effectively carried out. The practice adopted in some firms of using oil paint, water paint, or similar durable treatment for walls and ceilings, in place of the traditional limewash, is commended.

Greater attention should be paid to the decoration of wooden partitions, doors, window frames and other structural woodwork, preferably by painting. Corrodible metal parts, such as machine frames, and casings, guards, pipes, ducting, structural steelwork, furnace casings, tanks, etc., should be kept painted. Similarly outsides or facing parts of wooden fittings, such as racks, shelves and cupboards, should be kept painted.

- (iv) Poor lighting discourages cleanliness. Adequate natural lighting should be provided wherever possible and windows should be cleaned regularly inside and out. Otherwise, good artificial lighting, affording illumination over the whole workroom, should be provided. Attention is drawn to the Code of Practice for Good Lighting of Building Interiors, issued by the Illuminating Engineering Society, and to the free advisory service available from the British Lighting Council.

Dust

30. Health

No evidence has been obtained to establish a connection between abrasive operations in the cutlery and silverware trades and injury to health. The materials used in abrasive operations have been considered and medical opinion obtained. It appeared unlikely that any of the materials handled would give rise to lung disease, but the effect on health of any particular material depends on its method of use, and the quantity and particle-size of the dust produced.

It has been suggested that there is a substantial incidence of non-notifiable conditions, such as sinusitis, catarrh and bronchitis amongst workers in the trades. This contention could not be confirmed without extensive and detailed medical investigation, and the medical opinion obtained suggests that there is not sufficient evidence to warrant such an investigation. Nevertheless, the Committee takes the view that exposure to substantial quantities of respirable dust of any kind must be deprecated and that the suppression of dust is desirable on cleanliness grounds alone.

31. Dust Extraction—Existing Provision

It is customary for exhaust ventilation to be generally applied to the following processes:

- Dry grinding (flatware edges, bolsters, etc.).
- Glazing (of knives).
- Dollying.
- Silverware finishing.

Exhaust ventilation is not normally applied to:

- Wet grinding.
- Silverware buffing (sand and pumice).

The type of exhaust ventilation used is relatively simple and consists of a hood behind the wheel, or a grid in the bench beneath the wheel, leading to a duct from which air is drawn by means of a fan. The exhausted air is usually carried outside the workroom to a settling chamber or cyclone.

Recent research in other fields, e.g., fettling and dressing operations in foundries, has cast doubt on the ability of conventional types of exhaust ventilation to remove from the operator's breathing zone that fine airborne dust which is invisible under normal lighting conditions but which is known to be the most harmful. References to publications dealing with this point are listed in Appendix I.

It is possible, therefore, that existing dust extraction plant used in the trades has similar inadequacies. This point can only be determined by detailed investigation of the various processes to discover the locus of any dust clouds evolved and the size of dust particles produced. Such investigation would indicate the effectiveness of existing exhaust plant. Should serious defects be revealed, further research would be required to design and develop improved types of plant.

32. Research

The Cutlery Research Council allocated a proportion of its resources to be applied to dust problems during 1961 and subsequent years. This programme would cover only those sections of the trades supporting the Cutlery Research Council and it would exclude the silverware processes.

This is particularly unfortunate since the latter processes include some of the dustiest in the industry.

Since the Sub-Committee on Cleanliness and Dust considered this matter, the Cutlery Research Council has been reconstituted as the Cutlery and Allied Trades Research Association, and other Sheffield industries of a like nature may become members. The development has not, however, altered the position as far as research in the cutlery and silverware trades is concerned, and it is still confined to the cutlery section.

The National Union of Gold, Silver and Allied Trades proffered financial assistance for any research undertaken into silverware processes, provided the employer's association, at that time the Master Silversmiths' Association, also contributed. By a recent amalgamation the Master Silversmiths' Association has joined with the Cutlery Manufacturers' Association to form the United Kingdom Cutlery and Silverware Manufacturers' Association.

The Sub-Committee approached the Factory Inspectorate to enquire what support might be expected from them. It was thought that the resources and experience of the Inspectorate would be particularly valuable in the early investigatory part of a research programme.

33. Relevant Legal Provisions

The principal legal requirements relating to dust are contained in the Grinding of Cutlery and Edge Tools Special Regulations 1925 and 1950.

Regulation 1 requires for "racing", "dry grinding", or "glazing" processes the provision of adequate appliances for the interception of the dust as near as possible to the point of origin thereof, and for its removal and disposal so that it shall not enter any occupied room. The appliances must include a hood, a duct, and a fan, or equally effectual arrangements.

Regulation 4 requires examination and test of the ventilating plant by a competent person every six months. Particulars of the examination and test must be kept in an approved register.

Criticism of these provisions is hardly possible until the results of the research mentioned above have been obtained. The end to be achieved, i.e. interception, removal and disposal of the dust so that it shall not enter any occupied room, is stated clearly enough, but without research it is impossible to say what injurious dust is present and how far it is entering the atmosphere of the room. Similarly, research is necessary to determine the adequacy of any ventilating plant.

It is noted that the process of "sand buffing" is excluded from the definition of "glazing" under the Regulations and exhaust ventilation is therefore not legally required. Sand buffing and pumice buffing are acknowledged to be dirty processes productive of much dust but, again, only research could indicate how far the dust was likely to be inhaled by the operators, and whether methods of suppressing the dust could be devised.

34. Recommendations on Dust

Research should be carried out in the main abrasive operations in the cutlery and silverware trades to determine:

- (a) The locus of any dust clouds evolved and the size of dust particles produced.
- (b) The effectiveness of existing forms of exhaust ventilation plant in intercepting and removing such respirable dust as might be revealed by (a).

If the results obtained from these investigations warrant it, further research would be necessary to devise and develop effective forms of exhaust ventilation plant.

Machinery

35. The machines to be considered by the Committee were largely determined by the accident statistics which are tabled below:

Year	Accidents on powered process machinery			
	Power presses	Polishing wheels	Roll polishing machines	Other
1956	4	59	—	14
1957	1	34	2	6
1958	4	26	4	9
1959	11	39	6	13
1960	3	59	2	10
1961	7	55	7	19
1962	8	56	5	24
1963	8	63	7	22
Totals	46	371	33	117

Since polishing wheels were obviously the largest single cause of accidents in the trades, this category was examined first.

Polishing Wheels

36. In the statistics "Polishing Wheels" was taken to include all revolving wheels to which articles were applied by hand. For specific reference to various types of polishing wheel the following definitions have been applied:

- BUFF — A wooden wheel with a leather periphery.
- MOP — A wheel made up from a number of textile discs riveted between fibre or similar washers.
- DOLLY — Same construction as "mop" but with circular runs of stitching at intervals from the centre.
- FELT — A wheel made from solid felt.
- LEATHER — A wheel made from solid leather.

A detailed analysis of the accidents from 1956 to 1963 was made. The following table shows the causes of these accidents:

Article Snatching Accidents

Articles Involved

Period 1956 to 1963

ARTICLE	TOTAL
Knives	112
Spoons	16
Scissors	19
Hollowware	14
Forks	15
Compo bars	3
Dressing stone	2
Screwdriver	1
Total	182

The predominance of knives in this breakdown led to consideration of the use of backing sticks as a safeguard. It is apparently the practice in the trade for backing sticks to be used for rough glazing but not for final polishing processes. It was thought that wider use of backing sticks would reduce the likelihood of snatching, and would also render the need for finger rag protection unnecessary. Although objections might be raised on the ground that backing sticks injure the finish of a knife blade during final polishing, it was decided that their use should be recommended for all processes. It was also noted that one firm used backing sticks for polishing spoons.

(3) Contact with Wheel or Spindle

The Committee concluded that those accidents due to inadvertent contact with the wheel or spindle might well be reduced by the use of hand protection and the use of backing sticks, as discussed above. The accidents again emphasised particularly the importance placed upon general hand protection as a safeguard.

The question of providing guards for wheels was also thought relevant to this class of accident, although the matter was more fully discussed when the Committee dealt with those accidents resulting from wheels bursting.

(4) Wheels Bursting

The Committee noted that Regulations were in preparation dealing with the safeguarding of abrasive wheels. Such Regulations would have to be met by the trades when they were issued.

It was also noted that the Grinding of Cutlery and Edge Tools Regulations 1925 and 1950, contained a requirement (regulation 13) concerning the speeds of grindstones and abrasive wheels. The regulation requires that a notice should be affixed specifying the safe working peripheral speed of every class of grindstone and abrasive wheel in use and the speeds of the shafts or spindles upon which the wheels were mounted. There was, however, no prohibition of the running of a wheel at a speed greater than the stated safe working speed, nor did the regulation cover wooden wheels as used in the cutlery industry. The Committee considered the law to be deficient in these respects.

The accident analysis revealed that some accidents had occurred through the bursting of wooden wheels, and the assistance of a representative from a manufacturer of such wheels was obtained before arriving at recommendations made to meet this hazard. Wooden wheels having segments of leather dowelled into the periphery (segmental buffs) were particularly examined.

Re-heading of such wheels by unskilled persons was thought inadvisable, and marking by the manufacturers of the safe working speed was recommended for all wooden wheels. It was noted that some users invariably fit metal side plates to wooden wheels in order to avoid damage from the securing nut. The Committee commended a development by one firm who fit on their segmental buffs a pair of dished plates, one on each side of the wheel, so placed that the outer rims of the plates grip the base of each leather segment. There was also one design of wheel in which each leather segment was dovetailed into the periphery of the wood. Another firm have developed a form of hood guard for use on segmental buffs. The design is shown in Fig. 5. Such guards might readily be used on all buffs. The Committee noted that it was sometimes the practice for wooden wheels to be mounted on taper-ended spindles. This would produce a bursting effect and was deplored.

(5) *Foreign Body in Eye*

The Committee noted that there were few accidents from this cause but would nevertheless emphasise the statutory requirement for the provision of suitable goggles or effective screens to protect the eyes of persons employed in the dry grinding of metals or articles of metal applied by hand to a revolving wheel or disc driven by mechanical power. It is recommended that similar protection should be provided for those engaged in corresponding work at all dressed wheels where, it is thought, the risk of eye injury is as great.

37. *Recommendations on Polishing Wheels*

- (a) All spindles should be made to take loose ends. Existing machines not so designed should be modified within two years.
- (b) The "bolted-on" type of wheel should be used whenever possible, and is essential for wooden wheels.
- (c) There is a wide variation in the degree of taper adopted for spindles in various factories and the aim should be to ensure a taper with as wide an included angle as possible. The included angle of taper should not be less than 40°. The thread should not be finer than eight threads per inch, and should not be carried to the top of the taper.
The diameter of a spindle end should be related to the size of wheel being used.
- (d) A sharp point at the tip of the taper is unnecessary, and the point should be kept blunt.
- (e) Graining leathers should be made sufficiently wide at the centre to prevent spindle points protruding.
- (f) Felt wheels discarded from double-headed machines should not be used on taper spindles unless the centre hole has been filled in and re-formed.
- (g) The fitting of domes or caps to polishing mops and dollies is a safeguard which might suitably be pursued with the wheel manufacturers.
- (h) The direction of rotation should be marked on all wheels used on taper spindles.
- (j) Suitable racks should be provided for all polishing wheels not actually in use.
- (k) Suitable guards should be provided for abrasive wheels. Where guards are quite impracticable, the use of tapered wheels with correspondingly tapered side flanges should be considered. Attention is drawn to Safety, Health and Welfare New Series Booklet No. 4, "Safety in the Use of Abrasive Wheels".*
- (l) Buffs should be provided with guards which would leave exposed only that part of the wheel necessary for the work.
- (m) Buffs should be marked with the safe working speed.

*Obtainable from H.M. Stationery Office, price 4s. net.

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Re-heading of such wheels by unskilled persons was thought inadvisable, and marking by the manufacturers of the safe working speed was recommended for all wooden wheels. It was noted that some users invariably fit metal side plates to wooden wheels in order to avoid damage from the securing nut. The Committee commended a development by one firm who fit on their segmental buffs a pair of dished plates, one on each side of the wheel, so placed that the outer rims of the plates grip the base of each leather segment. There was also one design of wheel in which each leather segment was dovetailed into the periphery of the wood. Another firm have developed a form of hood guard for use on segmental buffs. The design is shown in Fig. 5. Such guards might readily be used on all buffs. The Committee noted that it was sometimes the practice for wooden wheels to be mounted on taper-ended spindles. This would produce a bursting effect and was deplored.

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The Committee noted that there were few accidents from this cause but would nevertheless emphasise the statutory requirement for the provision of suitable goggles or effective screens to protect the eyes of persons employed in the dry grinding of metals or articles of metal applied by hand to a revolving wheel or disc driven by mechanical power. It is recommended that similar protection should be provided for those engaged in corresponding work at all dressed wheels where, it is thought, the risk of eye injury is as great.

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- (h) The direction of rotation should be marked on all wheels used on taper spindles.
- (j) Suitable racks should be provided for all polishing wheels not actually in use.
- (k) Suitable guards should be provided for abrasive wheels. Where guards are quite impracticable, the use of tapered wheels with correspondingly tapered side flanges should be considered. Attention is drawn to Safety, Health and Welfare New Series Booklet, No. 4, "Safety in the Use of Abrasive Wheels".*
- (l) Buffs should be provided with guards which would leave exposed only that part of the wheel necessary for the work.
- (m) Buffs should be marked with the safe working speed.

*Obtainable from H.M. Stationery Office, price 4s. net.

- (n) Re-heading of buffs should be carried out only by a wheel manufacturer, and a test should be applied after each re-heading.
- (o) In the case of segmental buffs, the Committee commend particularly:
- The design in which the leather segments are dovetailed into the wood.
 - The provision of clamping discs to grip the segments.
- (p) Buffs should not be placed on taper spindles.
- (q) Metal side plates are recommended for all buffs.
- (r) Attention is drawn to the potential danger of the section of revolving spindle exposed between the motor housing and the polishing wheel. Although there is little history of accident, fencing should be provided.
- (s) Attention is drawn to the danger involved in the use of loose rags for finger protection in polishing processes. It has been noted that in certain factories the use of such rags has been eliminated, and their general prohibition is recommended.
- (t) Further efforts should be made to secure the use of backing sticks for all knife polishing processes.
- (u) Attention is drawn to the statutory requirement for the provision of eye protection for dry grinding processes at abrasive wheels. Similar eye protection should be provided for those engaged in corresponding work at all dressed wheels.

Power Presses

38. In considering this subject the Committee recognised that it would be beyond its scope to examine in detail the operations carried out, or the type of presses used in the trades. Methods of guarding, and the principles to be followed to ensure safe working, had been dealt with in the various Reports issued by the Committee on "Safety in the Use of Power Presses".

It was apparent, however, that in general, guards were not provided and maintained on power presses in the cutlery and silverware trades in accordance with those Reports. The accident statistics indicate that half of the accidents occurred through the absence of fencing, but a proportion resulted from inadequate or improperly maintained guards.

Power Presses—Accidents at the Tools

	1956	1957	1958	1959	1960	1961	1962	1963	Totals
Total Accidents	3	1	3	8	3	5	4	5	32
Type of Press:									
(a) Crank Operated	1	—	2	7	2	4	2	3	21
(b) Friction Screw	2	1	1	1	1	1	2	1	10
(c) Hydraulic or Pneumatic	—	—	—	—	—	—	—	1	1
Guarding Position:									
(a) No guard	2	1	2	1	3	2	3	2	16
(b) Inadequate or defective guard	1	—	1	7	—	3	1	3	16
Injury:									
(a) Permanent Mutilation	3	—	1	5	—	3	1	3	16
(b) Other	—	1	2	3	3	2	3	2	16
Injured Person:									
(a) Young Person	—	—	—	3	2	1	—	3	9
(b) Woman	1	—	2	2	1	2	1	1	10
(c) Man	2	1	1	3	—	2	3	1	13

The Committee is informed that Regulations dealing particularly with the maintenance of guards for power presses, and of the presses themselves, are in course of preparation, and the issue of such Regulations would be welcomed.

It is appreciated, however, that there are certain problems of power press guarding, principally associated with the use of Sheffield-type presses, which might require detailed examination. The tradition in the cutlery and silverware trades has been to employ skilled persons to operate power presses, particularly the Sheffield-type, and this may account for the comparative freedom from accidents, even on those presses which have been used habitually without guards. The Committee realise this is not an acceptable alternative to the provision of secure fencing, and it is apparent that the supply of skilled labour is diminishing.

An essential preliminary task was to obtain information as to the processes carried on in the trades, and the number and types of presses used. This was done, and the information is included in a report which appears as Appendix II.

The assistance of the Committee on Safety in the Use of Power Presses was thought to be necessary if any satisfactory solution is to be found to the difficult problems which this report discloses.

Notes on a type of guard developed by one firm for use on friction screw presses are included in Appendix II. The guard is applied to a press used for bowling spoons and bending forks. Hitherto, fencing for these operations had proved difficult owing to the need for the operator to hold the work during the stroke, and the fact that the shape of the article was changed by the pressing operation.

39. Recommendations on Power Presses

In general, guards are not provided on power presses in the cutlery and silverware trades which comply with the Reports of the Committee on Safety in the Use of Power Presses.

Even when guards are fitted, they frequently are not maintained on the lines recommended in the Reports.

It is understood that Regulations dealing with the maintenance of guards and presses are in course of preparation, and the Committee would welcome their issue.

Appendix II is a report on the processes, presses and methods of guarding in the cutlery and silverware industries. This reveals that the recommendations of the Power Press Committee are rarely complied with, but it also indicates the difficulty in so doing. An investigation into the guarding problems of the industry appears to be necessary, and it is considered this could best be done by the Power Press Committee.

Automatic Roll Polishing Machines

40. The Committee considered two basic types of automatic roll polishing machines—those in which the rolls were placed vertically, one above the other, and the work was presented horizontally, and those in which the rolls were placed horizontally, and the work was presented vertically.

The former type can be divided into two classes—those in which the rolls are fixed, and those in which the rolls can be opened. Although the number of accidents recorded is not exceptionally large, some have resulted in very severe injury, and one fatality has occurred. The application of bar "compo", which necessitates close approach to the rolls, is undoubtedly a principal cause of accidents.

The Committee believe that secure fencing for the intaking point of the rolls is necessary if serious accidents are to be avoided. One machine maker has developed a fixed guard which affords a high measure of protection (see Fig. 10), and it was thought that a standard of fencing at least as high should be provided for all machines having fixed rolls.

There is no record of serious accident having occurred on machines where the rolls are capable of opening. One such machine which is most widely used has a trip bar at waist height along the front of the frame. The trip bar is arranged to operate a switch which opens the rolls. There is no evidence to suggest that this is not a satisfactory safeguard, but it is essential that the trip bar is suitably positioned and that when operated it immediately opens the rolls sufficiently to prevent an arm being trapped.

It is suggested that the application of liquid abrasive material by means of spray is a valuable aid to safe working and would facilitate the design of secure fencing. Some firms have used, with success, semi-liquid abrasive material in the form of a paste. It is placed in shallow troughs and the tips of the workpieces are dipped in the paste after being mounted in the jig, and before insertion in the machine. This method offers considerable advantages from the safety viewpoint. The Committee also commends a type of remote control for the application of bar "compo" which has been developed by one firm (Figs. 7, 8, 9 and 9(a)).

Machines in which the rolls lie horizontally, one behind the other, and the work jig is presented from above, are comparatively little used in Sheffield. We know, however, of a manufacturer in another part of the country using this type exclusively and on a large scale. No accidents are known to have occurred in Sheffield but we were informed of accidents elsewhere. The Committee consider they present an obvious potential trapping hazard and they note the type of guard illustrated in Fig. 10(a) which has been successfully used over a number of years at a factory outside Sheffield.

One important feature of work at vertical jig machines was that two firms adopted the precaution of stopping the rolls before removing or replacing a work jig. This, in itself, is a valuable safety measure but it has the further advantage of permitting the development of interlocked guards. It is suggested that a guard could be designed which would enclose the rolls and table area but have a hinged portion to permit access for jig changing. The hinged portion could be electrically interlocked with the motors driving the rolls so that opening the guard would switch off the power.

Single roll polishing machines do not present the same dangers as the two-roll machines. It is noted that it is sometimes the practice to secure dollies on the spindle by means of split cotter pins with projecting ends. This has been responsible for the entanglement of clothing causing one accident and it is considered that any such projection on the spindle should be avoided.

41. Recommendations on Automatic Roll Polishing Machines

- (a) Fixed or interlocked guards preventing hand access to the intake of the rolls should be provided at all automatic two-roll polishing machines where the rolls are not capable of opening.
- (b) On machines where the rolls are capable of opening a trip bar may be accepted. The trip bar should extend across the width of the machine at the front and should be placed at a suitable height to ensure operation. When operated, the trip bar should open the rolls sufficiently to prevent an arm being trapped.
- (c) Liquid abrasive materials applied by spray are a valuable aid to safe working and facilitate the application of secure fencing. Their extended use should be encouraged. Similar considerations apply to abrasive material in the form of a paste into which the workpieces are dipped before insertion in the machine.
- (d) On single roll polishing machines, split cotter pins should not be used for securing dollies on the spindle.

Other Machinery

42. The Committee considered certain other machines in use in the trades. Although the statistics indicated that they did not produce as many accidents as the three main categories described above, in some instances there was sufficient evidence to warrant recommendations.

(a) *Drop Stamps*

Stamps used on cold work were particularly examined. Drop stamps, friction screw presses, or knuckle presses are used indiscriminately for various cold pressing operations, particularly in the spoon and fork trades. The safety problems associated with drop stamps are, therefore, comparable with those arising at power presses, and a Joint Standing Committee already exists to consider the safe working of power presses. It is known that cold stamping operations are performed in the jewellery trades in Birmingham and it was thought the assistance of the Power Press Committee might be sought to examine the problems arising during cold work in the cutlery and silverware trades.

(b) *Double-headed Machines*

These machines consist of two polishing wheels mounted side by side on horizontal spindles (see Fig. 6) and are mainly used for polishing knife blades. The blades are placed on a work rest in front of the wheels, and in some instances the rest can be moved up and down. One of the wheels can be moved sideways in relation to the other so as to provide a gap between the working surfaces for insertion or removal of work.

Risk of injury is presented at the point where the wheels run inwards at the top, and occasionally severe accidents have occurred. Many firms provide a single hood guard over the wheels, as shown in Fig. 6. In some cases, however, an independent hood guard is provided for each wheel, and a gap is left between the hoods through which access to the wheels is possible. The gap can be readily bridged by an additional guard as shown in Fig. 6(a). The bridging piece is slotted at one end to permit sideways movement of the wheel and original guard.

The Committee noted that one firm had devised a form of mechanical feed for applying bar "compo" to the wheels of a double-headed machine.

(c) *Cross-rolling Mills*

There was no record of accident on cross-rolling mills during the years analysed, but the Committee thought it advisable to include illustrations of the types of guard normally provided for the inrunning sides of the rolls. These are shown in Figs. 3 and 4.

43. Recommendations on Other Machinery

- (a) The attention of the Joint Standing Committee on "Safety in the Use of Power Presses" should be drawn to the problems arising during cold work in the cutlery and silverware trades.
- (b) Fixed guards should be provided to protect the polishing wheels of double-headed polishing machines. The guard may be in the form of a single hood encasing both wheels, or individual hoods for each wheel, but in the latter case it is essential that a gap is not left between the hoods through which access to the inrunning point of the wheels might be gained.
- (c) Fixed guards should be provided at cross-rolling mills to prevent finger access to the inrunning side of the rolls.

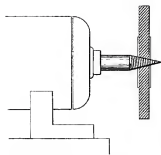


FIG. 1(a):
Long sharp taper with exposed portions
of screw and protruding point. Frequent
cause of entanglement of finger rags.

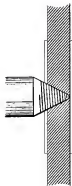


FIG. 1(b):
Blunt taper (included angle 40°). Mini-
mum exposure of screw and no pro-
truding point. Note the screw is not
carried to the top of the taper.

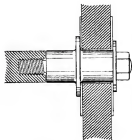


FIG. 1(c):
Bolted-on type of polishing wheel.
Method of attaching loose end to main
spindle is shown.



FIG. 1(d):
Loose end with outer portion reduced
in diameter to accommodate smaller
wheels.

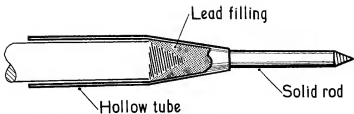


FIG. 2:

Loose spindle for mounting on existing screwed taper end. The tapered portion of the hollow tube is filled with lead to form a plug which the screwed point of the main spindle can penetrate. The solid rod forming the end of the loose spindle is tapered and screwed to accommodate small polishing wheels.

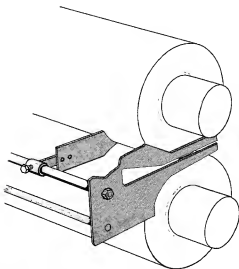


FIG. 3:

Type of guard used to protect the inrunning nips of cross-rolling mills.

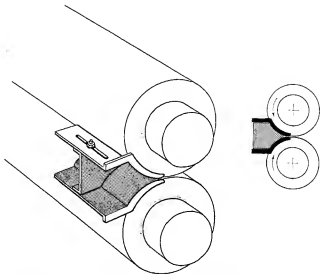


FIG. 4:
Type of guard used to protect the intrunning nips of cross-rolling mills.

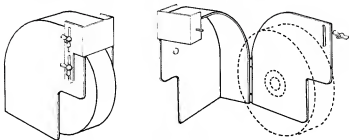


FIG. 5:
Hood guard suitable for buff. The upper part of the guard is adjustable at the front.

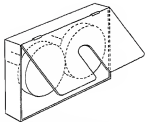
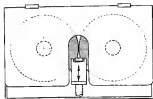


FIG. 6:

Hood guard for double-headed machine. The hood covers both wheels and prevents access to the inrunning point at the top. Access for applying compo is provided below the hinged flap at the front.

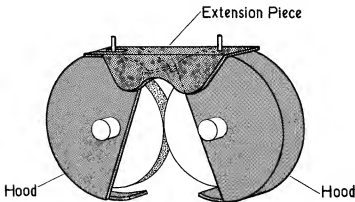


FIG. 6(a):

Alternative form of guard for double-headed machine. Individual hoods are provided for each wheel but an extension piece spans the opening between the hoods. The extension piece is slotted at one end to permit sideways movement of one wheel.

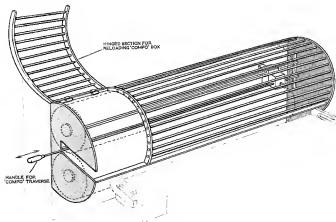


FIG. 7:

Fixed guard for automatic two-roll polishing machine. Provision is made for application of bar "compo" from outside the guard.

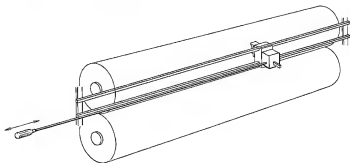
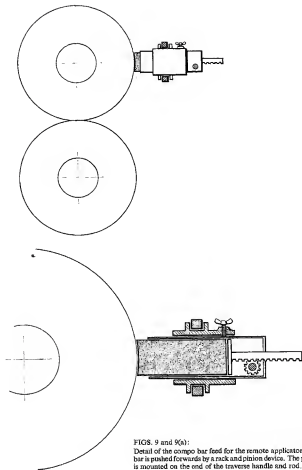


FIG. 8:

Detail of traverse slide for Compo Applicator.



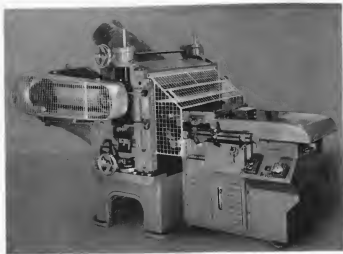


FIG. 10:

Showing the fixed guard made by Messrs. Walters and Dobson Limited for fitting to their automatic two-roll polishing machines. The sloping part of the guard at the front has a hinged flap which can be raised to allow access to the compo slide for application of bar compo. The intake of the rolls remains protected by a horizontal panel of wire mesh attached to the lower guide bar of the compo slide.

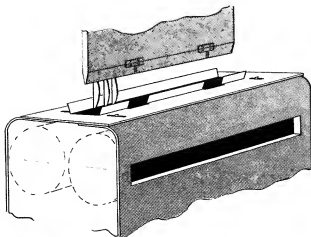


Fig. 10(a):

Fixed guard for the rolls of a roll polishing machine with vertical jig. The top portion of the guard is slotted to permit adjustment for roll wear. An aperture is provided at the front of the casing for applying bar "compo".

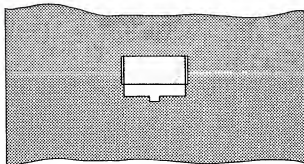


FIG. 11(a):

Front view of guard screen and aperture

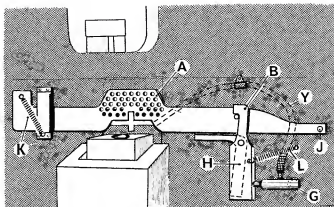


FIG. 11(b):
Rear view of guard screen showing
shutter mechanism. The shutter is in the
closed position.

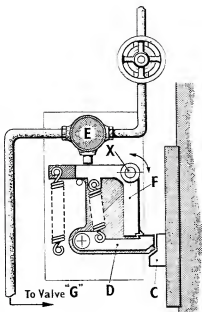


FIG. 11(c):
Detail of air valve trip mechanism.

Guard for Friction Screw Press

The guard illustrated is for use on friction screw presses used for the processes of spoon bowling, fork bending, and handle forming, etc. The workpiece being held by the operator during the operation prohibits the use of a normal interlocked guard.

The guard consists of two parts. The first is a metal screen attached to the press table with a hole large enough for the article to pass through when being withdrawn after forming. (See Fig. 11(a).) A portion of the screen above the opening is fitted with a panel of transparent plastic to improve the operator's view of the tools. The screen is placed sufficiently close to the dies to permit the work (e.g., a spoon or fork) to be held by the operator. The hole is covered by a shutter (see Fig. 11(b)) which, when closed, leaves an opening so narrow as to prevent access into the danger area, but which permits the workpiece, which is then flat to be inserted. This shutter can be locked in its closed position and it is opened automatically by a pneumatically operated piston to permit withdrawal of the work after forming.

The second part consists of a tripping mechanism which is operated by the ram of the press. (See Fig. 11(c).) This mechanism is a standard unit manufactured by Pneumatic Systems (Engineers) Limited of Sheffield.

The following details the operation:

When downward movement of the ram begins the shutter "A" is in its lowest position and locked by the catch on lever "B". The gap beneath the shutter is then about $\frac{1}{2}$ ". On its downward travel a cam plate "C" attached to a bracket on the ram depresses trigger "D", which is free to rotate on its fulcrum. When the ram begins to rise the cam plate contacts the trigger "D" which locks in arm "F" and causes the whole back plate to rotate about fulcrum "X" to depress the plunger on air valve "E".

Air pressure in cylinder "G" causes its piston to operate catch lever "B" and unlock the guard shutter. Subsequent travel of the catch lever causes movement of lever "H" to raise the guard shutter which is pivoted at "J".

Cam plate "C" is designed with a sufficiently long "flat" to maintain the "guard open" position until the ram reaches the top of its stroke. The plunger of air valve "E" is then released, and the piston is withdrawn in cylinder "G". The guard shutter then closes under the influence of spring "K" and is locked by the catch lever which is returned by spring "L".

It should be noted that exhaust air from cylinder "G" can be conducted through a flexible pipe to provide an air jet for cleaning the bottom tool.

The connection between the air valve operating mechanism (see Fig. 3) and the cylinder "G" for the guard shutter is made by flexible pipe with a bayonet connection at the point of entry to the guard screen. This permits ready disconnection of the air supply when the guard has to be removed.

The upper portion of the guard shutter has been drilled to improve the operator's view of the tools.

APPENDIX I

See Para. 31

References concerning Dust Extraction and Control

- (1) *Conditions in Iron Foundries*—First Report of the Joint Standing Committee, Her Majesty's Stationery Office, London, 1956.
- (2) *Safety, Health and Welfare Conditions in Non-Ferrous Foundries*—First Report of the Joint Standing Committee, Her Majesty's Stationery Office, London, 1957.

APPENDIX II

See Para. 38

Processes using Power Presses

KNIVES—FORGED

Fifteen firms carry on the manufacture of knife blades, i.e. table blades, butcher and similar large blades, bread knives, etc., from forgings, as distinct from the "whittle tang" type of blade which is blanked from strip. Of these firms, 12 use power presses for clipping the forgings whilst they are cold, and the remaining three clip whilst the forgings are hot.

The survey indicates that 74 Sheffield presses and four normal crank presses are used on cold processes.

The following is a description of the tools and processes in a typical factory:

Tangling

This is done first. The blank which has been drop-stamped to form the bolster and tang, and rolled to draw out the blade, is in the form shown in the attached (Fig. 12(a)). The operator holds the blade end, and presents the tang to the tools. These are in the form shown in the attached (Fig. 13(a)). The tang is located on the bottom tool by fitting the partly formed tang and bolster into the aperture of the tool. Operation of the press cuts off the fash by forcing the tang and bolster into the bottom tool which is relieved to permit withdrawal. A crude form of stripper "finger" is fitted to strip the fash from the top tool. The fash is finally flicked away by the operator, using the next blank or a poker held in the other hand.

Cutting out Blades

The operator holds the tang of the half-completed blank, and places the blade on the bottom tool, which is shown in the attached (Fig. 13(b)). Location is by means of a simple finger which locates behind the bolster. This positions the blank for length, but the operator must ensure by visual means that the blade blank lies wholly over the aperture in the bottom tool. The upper tool is a simple punch corresponding with the blade shape of the bottom tool.

Operation of the press forces the blade through the bottom tool. The operator then releases the tang, and the completed blank is tipped through the tool, through an aperture in the press table, and into a bin below. As in the tanging operation a simple stripping "finger" is fitted to strip the fash from the top tool. The fash is finally flicked away by the operator.

Guards are not normally provided for the above operations. The need for the operator to hold the work during the stroke of the press precludes the use of any form of interlocked guard. It is contended that a fixed guard would not be practicable because the operator must hold the blank during the operation, the blank must be located visually on the bottom tool, and there is frequent difficulty in removing and disposing of fash.

One firm, however, has experimented with a stripper plate on a Sheffield press used for cutting out table blades. This does not entirely preclude access to the trapping area, but is a praiseworthy attempt. Protection by means of stripper plates would only be possible on presses with a comparatively short stroke, and most of the presses used have strokes of between 1 in. and 2 in. The idea of using a stripper plate was put to the only firm using normal crank presses for these operations. The stroke of the presses was 1 in. They made an improved design of stripper plate, which gives a high degree of protection, and has proved practicable in use (Figs. 13(c) and 13(d)).

The only other approach seems to be through an improved design of tool which would allow the operator to release the work during the stroke of the press. An interlocked guard would then be practicable.

Larger blades, such as butcher blades, are usually made from forged blanks. These are usually clipped on Sheffield presses. Sometimes clipping is done without the operator holding the job, and an interlocked guard would be practicable. In other cases the firms claim that the job tends to spin, or vibrate out of position, during descent of the top tool, and the blank is held in the operator's fingers, or by means of a poker during descent of the tool.

The top tool is tapered on the underside to give a "slicing" cut on the blank. This means that the tool makes a point contact when it first touches the blank, and since the blank is not itself perfectly flat, a tendency to spin or skid might well be produced.

SUMMARY

It seems that the tanging and cutting-out operations on table blades merit more detailed investigation.

Cutting-out of butcher and similar large blades is carried on by few firms, and is not therefore a general problem, but the operation merits further investigation.

KNIVES—WHITTLE TANG

Number of Firms	Presses		
	Sheffield	Crank	Hydraulic
5	4	15	3

Knife blades, usually table, bread, and carver blades, may be of the type known locally as "whittle tang". They are a cheaper form of blade and are made by blanking the blade and tang complete from stainless steel strip. Five firms carry on the processes which are quite straightforward and present no guarding difficulties.

SPOONS AND FORKS

Number of Firms	Presses			
	Sheffield	Crank	Friction screw	Toggle
20	36	128	32	6

Twenty firms manufacture spoons and forks from sterling silver, nickel-silver, or stainless steel.

The most practised method is by "double-blanking", in which blanks for spoons and forks are punched in pairs from strip material. The press operations are as follows:

Double-blanking

This is usually done on a conventional crank press. If the press has a short stroke closed tools are quite practicable. Otherwise, a stripper plate with fixed guard above can be used.

Clipping Spoons

The blanks from the above process, if they are intended for spoons, are cross-rolled to spread the bowl end. The irregular shape thus produced must be clipped to the required size. This is most frequently done on short-stroke crank presses when a stripper plate can be used. Flash is frequently ejected by air jet.

The only fencing difficulties arise in those firms which still use long-stroke presses, sometimes Sheffield type, for this process. Satisfactory fixed guards are not easy to design and are cumbersome. One firm design their clipping tools so that the blank is not held by the operator during the stroke, and interlocked guards are used.

Pronging Forks

Closed tools are invariably used for this process.

Strengthening or Bumping-up

This process is to produce a square cross-section in the shank of the spoon or fork. Although it is an operation for which a friction screw or hydraulic press would seem to be necessary, various other types (Sheffield, crank, and toggle) are used. Whatever the type of press fixed guards should present no difficulty. A fixed panel of perspex or vertical bars with a vertical feed slot about $\frac{1}{2}$ in. wide is commonly provided.

Spoon Bowling, Fork Bending, and Handle Forming

When not done on drop stamps these processes are usually performed on friction screw presses. Fixed guards are normally provided but these have apertures designed to permit withdrawal of the formed or shaped article and, therefore, would allow finger access to the trapping area. The articles are held during the stroke of the press. One firm has designed a form of guard with a moving shutter, operated by pneumatic means which affords a high degree of protection.

Another firm uses a form of "single-piece" tool which supports the whole of the blank. The complete forming process on a spoon or fork is thus done in one blow. Since the blank is not held by the operator interlocked guards are practicable and have been adopted.

Gate-ending

This is the process of cutting of the bar or "gate" of metal which is left across the points of fork prongs. The presses are usually set on continuous operation and the tools are of such a design that the possibility of trapping is remote.

Double-blanking with Single Tools

This process is only carried on in two firms who blank for the trade, and normally have only short runs. It is therefore not economical to use expensive double tools, and single tools which cut out one blank at each stroke of the press are used. Sheffield presses are normally used in the process.

The nickel-silver or stainless steel strip is cut into short lengths. These are fed between the tools and the operator cuts out blanks in one direction. The strip is then turned round, and fed through again, so that the alternate blanks are cut out. Fixed guards should be practicable, but arouse

strenuous opposition from the operators who have to locate the strip visually, since no locating pins are fitted in the tools. This process will, however, probably die out in the not too distant future.

Single-blanking

This too is a method of production which is dwindling rapidly, but is still used in some firms for producing short runs of heavier quality spoons and forks.

The nickel-silver strip is cut on a guillotine into narrow pieces, each just sufficient to produce one spoon or fork blank. The bowl or prong end is cross-rolled, and sometimes the handle end is also cross-rolled. The spoon or fork blank is then cut out from this rough shape on a press with a single tool. Location is by means of simple back stops. Some firms claim that the blank tends to spin during the stroke of the press owing to the shear on the top tool, and the operator must steady it with a wooden probe. In other cases the work has been seen to be done without any steadying by the operator, and interlocked guards are used.

SUMMARY

It seems that there are few operations in the manufacture of spoons and forks which present insuperable difficulty in the provision of fencing. The operations where difficulty is claimed are as follows:

Clipping Spoon Bowls

The problem only arises in a few firms who still retain long-stroke presses. It will have to be recognised that the complete answer lies in the use of closed tools on short-stroke presses.

Double-blanking with Single Tools

This forms such a small proportion of the trade's output that it is not a general problem. Fixed guards which will permit adequate vision should be practicable, and would probably be achieved by insistence.

Single-blanking

This too forms a very small proportion of the trade's output. Interlocked guards are probably the best solution here, although in some cases modification of the tools may be necessary to eliminate steadying of the work during operation of the press.

SCISSORS

Number of Firms	Presses		
	Sheffield	Crank	Friction screw
9	28	111	29

Scissor blanks are produced by two methods—hot forging and cold pressing. Hot forged blanks are made initially on drop stamps, and power presses are used only for cropping lengths from steel bar, and for subsequent clipping operations on the forged blank.

Cold pressed blades are made initially on friction screw presses, or sometimes crank presses, from a length of bent rod. Power presses are used as with hot forged blades for subsequent clipping operations.

After forging or pressing, the blade shape is impressed in the metal, but there is an irregular flash around the periphery and the "bow" or fingerhole is not perforated (see Fig. 14(a)). Removal of the flash is accomplished in a variety of ways. A typical method is as follows:

- (1) The shank and outside edge of the bow are clipped. In this operation the blank is punched through a shaped aperture in the lower tool (see Fig. 14(d)). The tool is relieved at the bottom so that the blank is released. Holding the blade, the operator drops the blank through the "bow" hole in the bottom tool. A simple stripper plate or finger is used, and the flash is pushed off the lower tool by the operator with the next blank.
- (2) The blade is cut out. The blade is held by the operator in both hands—one hand at the bow end, and one at the point. The blade is punched through the lower tool (see Fig. 14(c)), and withdrawn towards the front by the operator.
- (3) The bow is punched. This is a simple operation for punching the hole through the bow.
- (4) The heel of the shank is squared. This is again a simple operation for squaring off the lower part of the blades where the two blades of the scissors meet when pivoted together.

The two latter operations can usually be carried out with "closed tools", but the first two operations are performed without guards. This situation arises partly from the type of tool used. The arrangements for location, if any, are rudimentary, and reliance is placed on a combination of vision and "feel" to ensure correct location. Further, the blank is held by the operator during the stroke of the press. In some factories both of the operator's hands are used to hold the blank for the blading operation, as described in para. (2) above. It is suggested, however, that this is unnecessary and adds appreciably to the risk of trapping. In other firms, the blank is held by one hand only at the bow end.

An additional difficulty in the clipping of bow and shank is the need for twisting and tipping the clipped blank in order to free it and eject it through the bottom tool. Fencing is clearly impossible, and the operator's hands must be perilously near to the danger zone.

The following variations in production methods have, however, been seen in factories, and they offer some advantage in devising safety precautions.

- (1) Some firms clip the whole of the scissor blade, shank and bow in one operation, instead of clipping the bow and shank separately from the blade. They find this method suitable for blades up to about 9 ins., and it is used for both hot forged and cold pressed blanks. The advantage here is that the blank is not held by the operator during the clipping operation, and an interlocked guard would be practicable.
- (2) In one firm the clipping of the bow and shank is performed on a bottom tool which is so cut away at the underside that the clipped blank can be withdrawn towards the front, without any need for twisting or tipping. (See Fig. 14(f).) This has permitted the use of a fixed guard with a vertically sliding front panel. The sliding panel has a horizontal slot large enough to permit insertion of the scissor. As the scissor is pressed downwards by the stroke of the punch, the sliding front panel moves downwards accordingly, and allows withdrawal of the scissor at a lower level. The sliding panel is spring-loaded to return it to its upper position.
- (3) Clipping of the bow and shank is performed in another way in one factory where the blanks pass in succession through the bottom tool. (See Fig. 14(g).) In this instance the firm have provided full stripper plates which afford satisfactory protection. A "bottle brush" is used to sweep away the flash.

- (4) In the same factory the blade is cut out on a tool which supports the full length of the blade, and holding is not necessary. The previously clipped bow and shank are used as a guide, and the complete stripper plate is used. An interlocked guard would also be quite practicable if necessary.

Other ancillary press operations performed on scissor blades are:

(a) *Marking*

The makers' name, etc., are marked on the blade by a marking punch. Although this seems a job for which hydraulic or pneumatic presses would be ideal, surprisingly enough the job is usually done on small crank presses, and reliance has been placed upon reducing the stroke of the press so that finger access beneath the marking punch would be very difficult.

(b) *Flattening*

Final flattening of the blade is carried out either on a crank press, or a friction screw press. Interlocked guards should be practicable, although one firm has devised a chute feed for insertion of the blade, with air jet for ejection.

SUMMARY

Although for most of the operations carried out on scissors examples can be found of satisfactory fencing for the tools involved, these cannot be universally adopted, and a more detailed investigation is necessary.

The problem of guarding is linked with the problem of locating the blank. The quality of a blank produced by hot forging is very different from that of a cold pressed blank. It is more vital that a forged blank should be accurately located for the clipping processes. A badly located forged blank will cause a broken tool, whereas a badly located pressed blank will probably produce nothing worse than a wasted blank.

Devices which could be successfully adopted by firms producing blanks for finishing themselves might be claimed to be a greater financial burden on firms who blank for the trade, where speed of production is more important, and where the range of tools used is great.

HOLLOWARE

Six firms use power presses in the manufacture of holloware. Twenty-nine presses are used and these are mainly large double-acting presses for deep drawing. Generally automatic guards have been provided but the survey suggested that the standard of performance for automatic guards, as advised by the Committee on Safety in the Use of Power Presses, is often not observed.

The users were apparently not aware of the recommendation that when calculating the distance between trapping parts account must be taken of the minimum distance between trapping parts when inserting or removing the components. The presses were thus being used for drawing components of such a depth that an automatic guard would not be admissible.

The only other power press operations in holloware are simple blanking of shapes from flat sheet or strip.

SUMMARY

No problems arise in the fencing of power presses used for holloware processes. Interlocked guards should be practicable for all drawing operations. Automatic guards should be used only after careful evaluation of the press and the work carried out in relation to the recommendations of the Power Press Committee.

HOLLOW HANDLES

Number of Firms	Presses		
	Crank	Toggle	Friction screw
2	7	2	2

Only two firms specialise in the manufacture of hollow handles and satisfactory fencing is provided for all the eleven presses used in the operations.

Hollow handles for knives, etc., are made in two halves. The halves are first blanked flat from strip. Closed tools should be practicable for this. The blanks are then formed in friction screw or toggle presses for which interlocked guards are the most practicable.

The final operation is to clip the formed half handle so that a precise outline is obtained for eventual joining of the two halves to form a complete hollow handle. Clipping is carried out on normal crank presses and again an interlocked guard is the most practicable form of fencing.

PEN AND POCKET KNIVES

Number of Firms	Presses		
	Sheffield	Crank	Friction screw
8	9	60	4

Manufacture is carried on by eight firms and the methods are so diverse that it is almost necessary to treat each firm individually. As with scissors there is a basic division between the firms producing pocket knife blades from hot forged blanks and firms producing them from cold pressings, or simple blanks cut from flat strip.

Hot forged blanks are made by drop stamping of shaped pieces cut from flat strip by power press.

After stamping, the irregularly shaped blanks are fashed in a power press to produce the finished shape of the blade. Other power press processes are the blanking out of springs from flat steel strip, and the blanking of scales from steel or brass strip.

Blanking of blade pieces, springs and scales should present no difficulty as closed tools or fixed guards should be practicable. Certain firms using old tools, without any location stops, plead the necessity for visual location as an impediment to the fitting of stripper plates or other fencing. These firms are usually blanking for the trade and have so many sets of tools that substantial modification of tool design would be an expensive undertaking.

Cutting out of the blade from irregularly shaped single forgings is another operation where fencing difficulties are claimed. As with other cutlery operations where articles are cut from irregularly shaped forgings it is claimed that full location on the tool is not possible and the operator must steady the blank during the stroke of the press.

One firm, however, had the crankshafts of their presses modified to give a maximum stroke of 1 in. This has permitted the use of closed tools for all pocket knife operations.

Nail nicking, i.e., impressing the nick used for opening the pocket knife, and name marking, are subsidiary press operations which should permit fencing by closed tools or fixed guards, although here again improved locating methods might be required.

Final flattening of the blade is often done on friction screw presses for which an interlocked guard is probably the most practicable form of fencing.

Blade blanks are occasionally cold pressed in continuous strip form. (See Fig. 15(b).) The final blade shapes are cut out from the strip. This method, although probably not used for higher quality work, presents obvious advantages in fencing.

SUMMARY

Although difficulties in fencing are claimed by some firms, in almost every case it is possible to find an instance where the operation concerned is being done successfully with proper protection. No difficulty arises with sufficient frequency to create a general problem.

TABLE KNIVES

FIG 12

a
Blank



b
Blank after Tanging



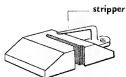
TABLE KNIVES

FIG 13

a Tanging Tools



View underside
of Top Tool

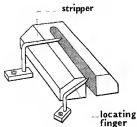


Bottom Tool

b Cutting out Tools



View underside
of Top Tool



Bottom Tool

TABLE KNIVES

FIG 13(c)

Stripper Fingers used on Sheffield
Type Press (1 stroke) for cutting
out Table Blades

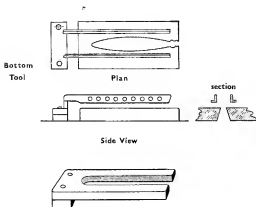
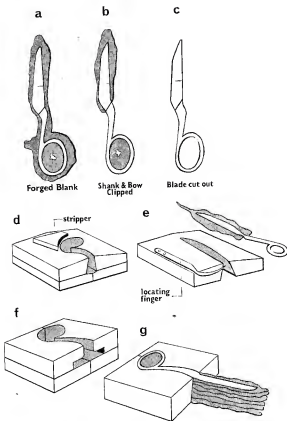


FIG 13(d)

Stripper Plate used on Crank Press

SCISSORS

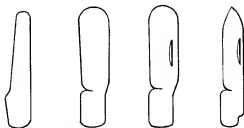
FIG. 14



POCKET KNIFE BLADES

FIG 15

a



**Blanked
Piece**

**Piece after
stamping**

**Nail
nicked**

**Blade after
cutting out**

b Cold Pressed Strip Blanks



APPENDIX III

Analysis of Accidents

1956-1963

YEAR	Transmission machinery		Power machinery		Non-power process machinery	Trans-port		Fires		Persons falling		Supplementary to colic. (1) to (19)						TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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ACKNOWLEDGMENTS

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- | | |
|---------------------------------------|--|
| <i>Figure 10</i> | Messrs. Walters & Dobson Ltd.,
Bailey Street, Sheffield 1. |
| <i>Figures 11(a),
(b) and (c)</i> | Messrs. Lewis Rose & Co. Ltd.,
Bowling Green Street, Sheffield 3. |
| <i>Figures 7, 8
and 9</i> | British Silverware Ltd.,
Howard Street, Sheffield 1. |

